

## MULTI-PART SHELF

BACKGROUND OF THE INVENTION1. Field of Invention

[0001] This invention relates to multi-part shelving and devices incorporating such shelving.

2. Description of Related Art

[0002] Typically, conventional shelving has consisted of a fixed solid support member, or an open wire mesh. Particularly, where effective air circulation is required, such as, for example, in a refrigerator, wire mesh or offset solid shelving is preferred. A number of conventional designs have attempted to improve on the conventional fixed single-support shelf.

[0003] U.S. Patent 3,998,069 to Kronenberger et al. discloses a three-part shelf for use in a refrigerator cabinet that has a solid support that covers a wire shelf and a lower condensate drip tray that collects condensation. In Kronenberger et al. the solid support covers a conventional wire refrigerator shelf to support the items to be refrigerated, while the condensate drip tray directs cold air and condensed water to the rear of the refrigerator. The solid support disclosed in Kronenberger et al. prevents the effective cleanup of spilled material unless all stored material is first removed from the solid surface prior to cleanup and directs spilled material to the rear, complicating cleanup.

[0004] U.S. Patent 3,877,767 to Bright discloses a pullout tray for use as a refrigerator shelf. The pull out tray disclosed in Bright is installed on top of a conventional wire refrigerator shelf and, when pulled out, extends from the wire shelf for access to stored materials. Because the pull out tray disclosed in Bright is installed on top of the conventional wire shelf, stored material must be removed from the pull out tray to clean up a spill.

[0005] U.S. Patent 2,078, 681 to Otte discloses a low cost stainless steel single sliding shelf for use in a refrigerator with a wire mesh bottom that allows spilled material to flow through the wire mesh onto stored material on lower shelves, or onto the floor of the refrigerator, thereby complicating effective cleanup.

[0006] U.S. Patent 2,140,611 to Smith et al. discloses a shelf structure that has a receptacle installed below the primary shelf for use as a hydrator. However, the portion of the shelf above the hydrator is solid, in order to maintain a higher humidity within the hydrator, and thus prevents use of the hydrator as a spill-catcher.

[0007] U.S. Patent 5,228,581 to Palladino et al. discloses a solid support member for transforming a conventional open-wire shelf into a solid shelf within a refrigerated display case. Because the solid support is installed above the wire shelf, it does not allow for the cleanup of spilled material without the removal of material stored on the solid support member.

[0008] U.S. Patent 3,908,562 to Wittschen discloses a material handling cart with a solid support as a shelf. The solid support has a wire mesh extension panel below the solid support that allows for shelf extension when more or larger materials require support. Because the mesh extension is provided below the solid support when not in use, stored material must be removed from the solid support in order to clean up spilled material.

[0009] U.S. Patent 2,692,813 to Toronto discloses a solid auxiliary shelf that swings out from under a conventional wire shelf when a refrigerator door is opened. The shelf is designed for the temporary placement of materials when the door is open. The shelf of Toronto, however, does not have a lip for containment of spilled material, thereby allowing a spill to cascade onto lower shelves and material stored on those shelves. Furthermore, the shelf disclosed in Toronto is not easily removable for cleanup.

#### SUMMARY OF THE DISCLOSURE

[0010] Various exemplary embodiments of this invention provide a novel multi-part shelf system to manage spills. The multi-part shelf system includes an upper portion comprising one or more openings and a lower portion comprising an easily movable solid shelf configured to catch and contain spilled material. The lower portion may be partially or fully removed and cleaned. Therefore, spilled material may be disposed of without having to move material stored on the upper portion, or having to clean material stored below the multi-part shelf.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Various exemplary embodiments of this invention will be described in detail, with reference to the following figures, wherein:

[0012] Fig. 1 shows an embodiment of a multi-part shelf system;

[0013] Fig. 2 shows the embodiment of Fig. 1 in which the lower portion is partially removed for cleaning;

[0014] Fig. 3 shows the embodiment of Fig. 1 in which the lower portion is fully removed for cleaning;

[0015] Fig. 4 shows another embodiment of a multi-part shelf system;

[0016] Fig. 5 shows another embodiment of a multi-part shelf system;

[0017] Fig. 6 shows another embodiment of a multi-part shelf system;

[0018] Fig. 7 shows an embodiment of a lower portion of a multi-part shelf system;

and

[0019] Fig. 8 shows a storage device incorporating a multi-part shelf system.

#### DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0020] Figs. 1-3 show one embodiment of a multi-part shelf system according to this invention. As shown in Figs. 1-3, the multi-part shelf 100 has an upper portion 110. According to this embodiment, the upper portion is a wire mesh shelf having integrated cross members 102, 104 that define openings 106. However, it should be appreciated that in various other embodiments, any solid support structure with one or more openings, for example, a plastic, nylon, vinyl, glass and/or metal shelf with one or more openings may be used as the upper portion 110. Additionally, in other exemplary embodiments, a mesh shelf of another material, such as plastic, vinyl, or nylon, may be used as the upper portion 110. On each side of the upper portion 110 of Figs. 1-3 there is provided an L-shaped support 130 for holding the lower portion 120 of the multi-part shelf 100. In this manner, the lower portion 120 may be easily inserted, pulled out, and optionally removed from beneath the upper portion 110.

[0021] It should be appreciated that in various other embodiments, other structure may be used that maintains a relatively close proximity between the lower portion 120 and the upper portion 110 and allows the lower portion 120 to be easily pulled out and/or removed from beneath the upper portion 110. Such structures or devices may include, but are not limited to, a rail and groove combination (e.g., Fig. 4), a wheel and track combination such as those commonly used on conventional drawers (e.g., Fig. 5), and/or a guide (e.g., Fig. 6).

[0022] The lower portion 120 is a solid tray-like structure configured to contain material spilled onto it from the upper portion 100. For example, as shown in Figs. 1-3, it may include a lip 122 around an area of the lower portion 120 to contain spilled material. In the depicted embodiment, the area is the whole of the lower portion, and therefore the lip 122 is around the perimeter of the lower portion 120. However, an area that is less than the whole of the lower portion may be used as well. The lower portion may be made from any suitable materials such as one or more of, for example, metal, glass, plastic, nylon, vinyl, rubber, and/or wood.

**[0023]** Furthermore, in various exemplary embodiments of a multi-part shelf system according to this invention, the lower portion 120 may be subdivided into separate compartments in order to, for example, prevent various spilled materials from interacting with one another (e.g., Fig. 7).

**[0024]** Fig. 4 shows one exemplary embodiment of a multi-part shelf 400 with a rail 410 and groove 420 combination that is usable to maintain a relatively close proximity between the upper portion 110 and the lower portion 120 of the multi-part shelf 400 and allows the lower portion 120 to be easily pulled out and/or removed from beneath the upper portion 110. As shown in Fig. 4, the rail 410, connected to the upper portion 110, is shaped to fit at least partially within the groove 420, connected to the lower portion 120. The rail 410 and groove 420 connect the upper portion 110 and lower portion 120 in a sliding fashion, such that the lower portion may be pulled out and/or removed for cleaning and/or removal of spilled material.

**[0025]** It should be appreciated that in various other exemplary embodiments that utilize a rail and groove combination, the rail may be connected to the lower portion and the groove connected to the upper portion. Furthermore, two or more rail and groove pairs may be used on either side or both of the upper portion and lower portion that cooperate with one another.

**[0026]** Fig. 5 shows one exemplary embodiment of a multi-part shelf 500 with a wheel 510 and track 520 combination that is usable to maintain a relatively close proximity between the upper portion 110 and the lower portion 120 of the multi-part shelf 500 and allows the lower portion 120 to be easily pulled out and/or removed from beneath the upper portion 110. As shown in Fig. 5, the wheels 510, connected to the upper portion 110, are shaped to fit at least partially within the track 520, connected to the lower portion 120. The wheels 510 and track 520 connect the upper portion 110 and lower portion 120 in a rolling fashion such that the lower portion may be pulled out and/or removed for cleaning and/or removal of spilled material. It should be appreciated that the number and placement of the wheels 510 shown in this exemplary embodiment is not limiting and both the number and placement of the wheels 510 may be selected depending on cost and/or design considerations.

**[0027]** Furthermore, it should be appreciated that in various other exemplary embodiments that utilize a wheel and track combination, the wheel(s) may be connected to the lower portion and the track connected to the upper portion. Furthermore, two or more

wheel and groove pairs may be used on one or both sides of the upper portion and lower portion that cooperate with one another.

**[0028]** Fig. 6 shows one exemplary embodiment of a multi-part shelf 600 with a guide 610, 620 that is usable to maintain a relatively close proximity between the upper portion 110 and the lower portion 120 of the multi-part shelf 600 and allows the lower portion 120 to be easily pulled out and/or removed from beneath the upper portion 110. As shown in Fig. 6, the guide includes a rail 610 that supports the shelf and a raised portion 620 that interacts with a groove 630 in the lower portion 120 to ensure that the lower portion is maintained substantially below the upper portion. The rail 610, raised portion 620, and groove 630 support the lower portion 120 in a sliding fashion such that the lower portion may be pulled out and/or removed for cleaning and/or removal of spilled material. It should be appreciated that in various exemplary embodiments the guide 610, 620 may be centrally placed. Alternatively, or one or more guides may be placed off center. The configuration, number, and placement of the guide 610, 620 and groove 630 may be selected depending on cost and/or design considerations.

**[0029]** Fig. 7 shows one exemplary embodiment of a lower portion 720 comprising dividing members 730 that divide the lower portion 720 into separate compartments 740. In this manner, the lower portion 720 is usable to substantially separate spilled material that is stored on the upper portion (not shown). For instance, if two materials are stored on the upper portion (not shown), each material respectively stored over a different separate compartment 740, and each of the two materials were spilled, each of the two spilled materials would be contained within its respective separate compartment 740, thereby avoiding interaction between the two materials. It should be appreciated that the number and placement of the compartments 740 shown in this exemplary embodiment are not limiting and both the number and placement of the compartments 740 may be selected depending on cost and/or design considerations.

**[0030]** An advantage of the above-described embodiments of a multi-part shelf according to this invention is that when a spill occurs, spilled material falls through the opening(s) 106 in the upper portion 110 of the multi-part shelf 100. The spilled material is caught by the lower portion 120 of the multi-part shelf and contained therein. Because the spilled material is contained by the lower portion 120 of the multi-part shelf, it is substantially prevented from remaining in contact with material stored on the upper portion 110, or coming into contact with items stored on shelves below the multi-part shelf 100.

[0031] Once the lower portion 110 has contained a spill, the lower portion 110 may be partially or fully pulled out, as shown in Figs. 2 and 3, and the spilled material may be quickly removed. In this manner, various embodiments of the multi-part shelf according to this invention provide for quick and efficient cleanup without moving material stored on or below the multi-part shelf 100.

[0032] Furthermore, once the lower portion 110 has contained a spill, in various exemplary embodiments, the entire lower portion 100 may be removed, as shown in Fig. 3, to be thoroughly cleaned in, for example, a sink or dishwasher. In this manner, various embodiments of multi-part shelves according to this invention also provide for a thorough cleanup of particularly messy or hazardous spills without moving material stored on or below the multi-part shelf 100.

[0033] Various exemplary embodiments of multi-part shelves according to this invention are particularly suited for use in devices that employ shelving. As shown in Fig. 8, one or more multi-part shelves 100 according to various exemplary embodiments of this invention may be installed in a device 810. The device 810 may be, for example, a refrigerator, a freezer, an oven, a microwave oven, a cabinet, and/or a freestanding shelf, or any other shelving environment in which the material to be stored in the shelving environment, whether liquid and/or solid, is susceptible to spilling. In this manner, material stored within the device 810 on one of the multi-part shelves 100 that has spilled is substantially prevented from remaining in contact with material stored on the multi-part shelf 100. Further, the spilled material is substantially prevented from coming into contact with items stored in the device 810 below the multi-part shelf 100 on which the spilled material was stored. The upper portion and/or support may be removably or permanently affixed to or incorporated into one or more optional walls of the device 810, or otherwise supported within that device 810.

[0034] The above-described embodiments of a multi-part shelf according to this invention should be viewed as illustrative, not limiting. Various modifications, substitutes, or the like, particularly with respect to the configuration of the openings within the upper portion, the number and arrangement of the compartments of the lower portion, and method or devices used to fasten the lower portion to the upper portion such that it may be easily removed, are possible within the spirit and scope of the invention.